

Decne. does not differ from *Cynanchum* and new combinations for the two species concerned are published. Finally, the nomenclature of one of the most frequent Malagasy leafy *Cynanchum* species, usually referred to as *C. subcoriaceum* Schltr., is clarified.

***Cynanchum absconditum* Liede, sp. nov.**

Plantae volubiles, herbaceae. Folia 20-28 mm longa, 10-18 mm lata, ovata, basem versus lobata vel auriculata, apicem mucronata, indumento sparso vestita. Inflorescentia umbelliforma, 4-, 6-flora. Petala 5.5-6 mm longa, oblonga, patentia, glabra, rosea. Corona gynostegialis alba, tubulosa, 4.5-5 mm alta, gynostegium longe superata, hoc perfecte celans, partibus staminalibus interstaminalibusque per partem 3/4-7/8 eorum longitudinis totae connatis. Forma partium interstaminalium solum differens, lobos inflexos. Partes staminales ad dorsum staminum appressae.

TYPE : *Decary 13298*, Madagascar, prov. Fianarantsoa, Ambatofinandrahana, 1600-1800 m, on quartzites, 23.2.1938, (holo-, P!). Only known material.

Plants twining, sparsely branched. Subterranean organs unknown. Shoots perennial, 0.8-1 mm diam., herbaceous, densely covered with erect, 400-450 μ m long trichomes. Leaves with 3-5 colleters at the base; petiole 8-12 mm long. Leaf blades herbaceous, 20-28 mm long, 10-18 mm wide, ovate, basally lobate to auriculate, apically mucronate, adaxially with erect, scattered 300-350 μ m long trichomes, indumentum equally distributed over the whole surface; abaxially with erect, scattered 300-350 μ m long trichomes, indumentum concentrated on veins and margins.

Inflorescence umbelliform, 4-6 flowered, all flowers open at the same time. Peduncle 5-10 mm long, densely covered with erect, 400-450 μ m long trichomes. Floral bracts 1 mm long, 0.3 mm wide at the base, triangular, glabrous. Pedicel 0.4-0.6 mm long, densely indumented with erect, 400-450 μ m long trichomes. Flower buds 5.5-6 mm long, 1.8-2.2 mm diam., elongated-conical; aestivation imbricate to apically contorted, dextrorse. Sepals 1.8-2 mm long, 0.4-0.6 mm wide, basally fused, abaxially with trichomes; free sepal limbs ovate to triangular, apically acute. Corolla rotate; petals basally fused, 5.5-6 mm long, adaxially and abaxially rose, glabrous; free petal limbs straight, spreading, oblong, apically acute. Gynostegial corona white, tubular, 4.5-5 mm high; exceeding and entirely obscuring the gynostegium. C(is) consisting of Cs and Ci fused for 3/4 to 7/8 of total corona height, only Ci differentiated. Cs appressed to the back of the stamens; Ci laminar; lobes of Ci triangular, strongly inflexed, with laterally involute margins. Gynostegium sessile, 1.6-1.8 mm high, 0.8-1.0 mm diam. Stamens with filament of 250-270 μ m height. Anthers higher than broad, elongated hexagonal, abaxially planar to convex. Anther wings convergent, 1.1-1.2 mm long, not extending along the whole length of the anther, which forms a 'pseudostipe' of 650-700 μ m height; distal ridge striate. Adjacent anther wings parallel to each other, basally centrifugal, widened, forming a distinct 'mouth'. Connective appendage 500-550 μ m long, 500-550 μ m wide, widely ovate, equalling the stamen in width, strongly inflexed. Pollinarium: corpusculum 240-250 μ m long; caudicles 300-340 μ m long, cylindrical, convexly recurved; pollinia 440-460 μ m long, 120-130 μ m wide, elliptical in cross-section, clavate, apically inserted. Styler head 530-540 μ m diam., 500 μ m high; upper part 200 μ m high, equalling lower part in height, conical. — Map 1, Fig. 1.

Fruit and seed unknown.

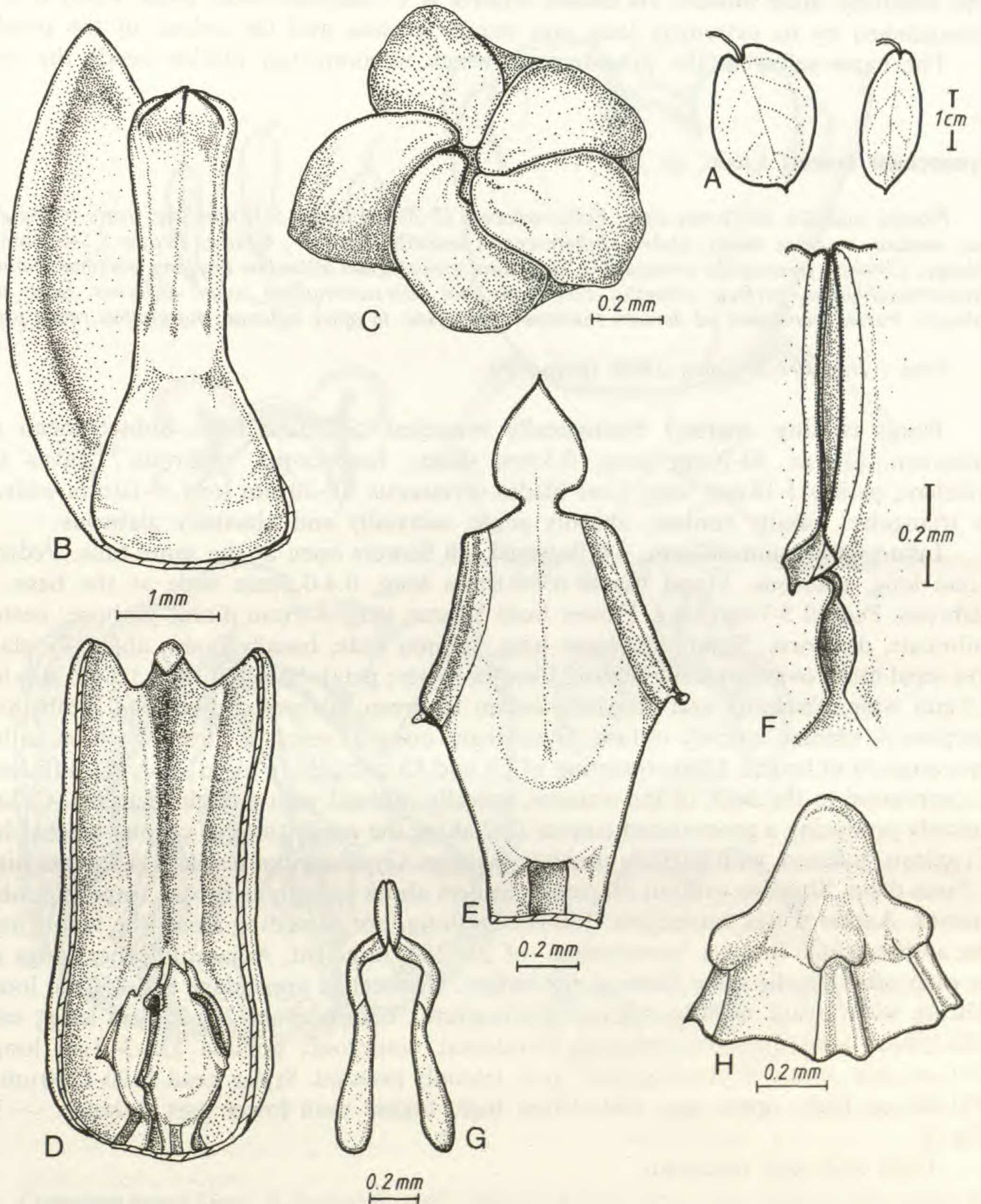


Fig. 1. — *Cynanchum absconditum* Liede : A, leaves; B, flower, four of the five petals removed; C, corona in top view; D, gynostegium in relation to corona (partially removed); E, anther, adaxial view; F, guide rail (two adjacent anther wings); G, pollinarium; H, stylar head. (Decary 13298).

This species belongs to the large, but exclusively Malagasy group of 'pseudolobe formers' with relatively small flowers. Its closest relative is *C. andringitrense*, from which it is easily distinguished by its extremely long and slender corona and the colour of the petals.

The name refers to the gynostegium, which is completely hidden inside the corona.

Cynanchum bosseri Liede, *sp. nov.*

Plantae volubiles, 50-70 mm altae. Folia coriacea, 15-20 mm longa, 5-10 mm lata, ovato-triangularia, in basi cordata, in apice acuta, glabra. Inflorescentia umbelliformis, 3-, 6-flora. Petala 3.5-4.5 mm longa, oblonga. Corona gynostegialis crenea, 3-3.5 mm alta, gynostegium altitudine aequans, partibus staminalibus interstaminalibusque perfecte connatis. Forma partium interstaminalium solum differens, lobos inflexos, galeatos. Partes staminales ad dorsum staminum appressae, in apice inflexae, marginibus rectis praeditae.

TYPE : *Humbert & Cours 23686* (holo-, P!).

Plants twining, sparsely basitonically branched, 50-70 cm high. Subterranean organs unknown. Shoots 50-70 cm long, 0.5 mm diam., herbaceous, glabrous. Leaves lacking colleters; petiole 5-14 mm long. Leaf blades coriaceous, 15-20 mm long, 5-10 mm wide, ovate to triangular, basally cordate, apically acute, adaxially and abaxially glabrous.

Inflorescence umbelliform, 3-6 flowered, all flowers open at the same time. Peduncle 6-8 mm long, glabrous. Floral bracts 0.7-0.8 mm long, 0.4-0.5 mm wide at the base, ovate, glabrous. Pedicel 5-7 mm long. Flower buds 5-6 mm long, 4-5 mm diam., globose; aestivation imbricate, dextrorse. Sepals 12-14 mm long, 6-7 mm wide, basally fused, abaxially glabrous; free sepal limbs ovate, apically obtuse. Corolla rotate; petals basally fused, 3.5-4.5 mm long, 1-1.2 mm wide, abaxially and adaxially cream to green, glabrous; free petal limbs straight, horizontal, oblong, apically obtuse. Gynostegial corona cream, 3-3.5 mm high, equalling the gynostegium in height. C(is) consisting of Cs and Ci completely fused; only Ci differentiated. Cs appressed to the back of the stamens, apically inflexed with straight margins. Ci laminar, apically producing a pronounced convex fold along the upper third of corona height; lobes of Ci galeate, inflexed, with laterally involute margins. Gynostegium sessile, 1.4-1.5 mm high, 1.6-1.7 mm diam. Stamens without filament. Anthers about as high as broad, trapezoid, abaxially convex. Anther wings convergent, 550-600 μm long, not extending along the whole length of the anther, which forms a 'pseudostipe' of 200-250 μm height. Adjacent anther wings parallel to each other, in the same plane as the anther. Connective appendage 800-850 μm long, 400-450 μm wide, ovate, slightly inflexed. Pollinarium : corpusculum 230-250 μm long; caudicles 130-150 μm long, flattened, straight, horizontal, trapezoid; pollinia 320-340 μm long, 180-190 μm wide, round in cross-section, oval, laterally inserted. Styler head 1100-1200 μm diam., 850-900 μm high; upper part 600-650 μm high, higher than lower part, tabular. — Map 1, Fig. 2.

Fruit and seed unknown.

DISTRIBUTION AND HABITAT : Madagascar, prov. Antsiranana, Massif du Marojejy; 1000-1700 m; lichen forest on quartzites and gneiss.

FLOWERING TIME : December to March.

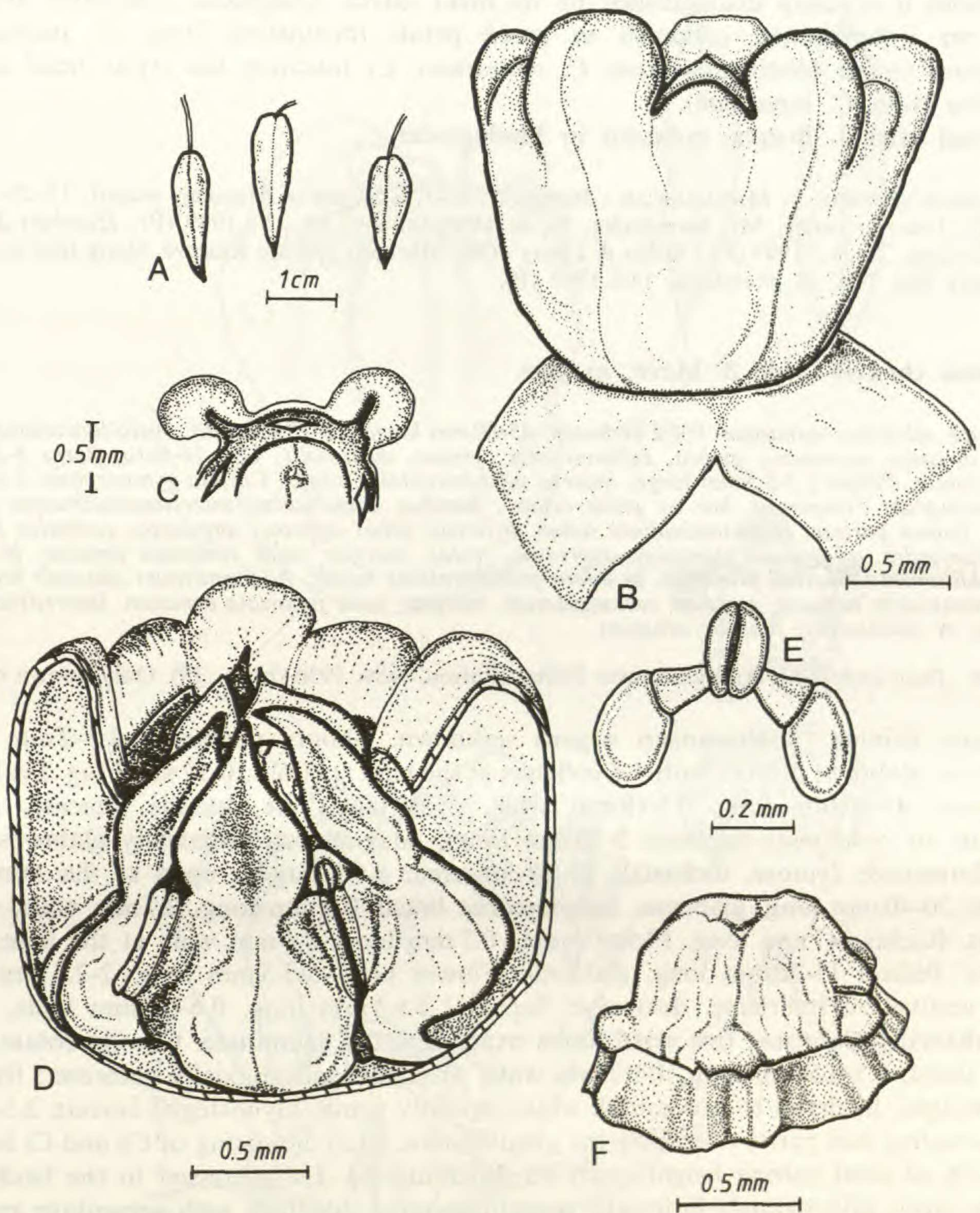


Fig. 2. — *Cynanchum bosseri* Liede : A, leaves (left, middle, *Humbert & Cours* 23686; right, *Miller & Lowry* 4088); B, flower; C, part of corona and gynostegium in top view, note the massive Ci in contrast to the undifferentiated Cs; D, gynostegium in relation to the corona (partially removed); E, pollinarium; F, stylar head. (*Humbert & Cours* 23686).

C. bosseri also belongs to the large group of small-flowered 'pseudolobe formers'. Within this group, its closest relatives are *C. masoalense*, *C. obovatum* and *C. repandum*. From these three species it is easily distinguished by its small leaves. Diagnostic characters are: few flowers per inflorescence, creamish to green petals (distinction from *C. masoalense*), gynostegium visible (distinction from *C. obovatum*), Ci touching the stylar head apically (distinction from *C. repandum*).

Named after J. BOSSER, collector in Madagascar.

MATERIAL STUDIED. — MADAGASCAR: *Humbert* 22543, E slopes of Marojejy massif, 15.-25.12.1948 (P); 23578, Lokoho valley, Mt. Beondroka, N. de Maroambihy, 17.-22.3.1949 (P); *Humbert & Cours* 23686, Marojejy, 25-26.3.1949 (P); *Miller & Lowry* 4088, Marojejy Nature Reserve, along trail to summit of Marojejy Est, NW of Mandena, 14.2.1989 (P).

***Cynanchum chouxii* Liede & Meve, sp. nov.**

Plantae volubiles, herbaceae. Folia herbacea, 45-80 mm longa, 13-18 mm lata, ovato-lanceolata, in basi cuneata, in apice acuminata, glabra. Inflorescentia cymosa, dichasialis, 12-, 24-flora, flores 8-20 simul apertos evoluta. Petala 5.5-6.5 mm longa, incurva vel horizontalia, ovata. Corona gynostegialis 2.5-2.8 mm alta, gynostegium exsuperans, hoc ex parte celans; partibus staminalibus interstaminalibusque perfecte connatis. Forma partium interstaminalium solum differens, lobos inflexos, unguulatos, carinatos formans. Partes staminales, ad dorsum staminum appressae, rectae, margine valde fimbriata ornatae, in dimidio supero additamento adaxiali praeditae, in infero protuberatione basali. Additamentum adaxiale brevior vel partem staminalem aequans, erectum, rectangulatum, margine valde fimbriata ornatum. Interstitium partis staminalis et additamenti fimbriis ornatum.

TYPE: *Descoings* 1821, Andrambovato Forest Station, Nov. 1956 (holo-, P!). Only known material.

Plants twining. Subterranean organs unknown. Shoots perennial, 1.5-2 mm diam., herbaceous, glabrous. Leaves with 4-5 colleters at the base; petiole 10-12 mm long. Leaf blades herbaceous, 45-80 mm long, 13-18 mm wide, ovate-lanceolate, basally cuneate, apically acuminate to mucronate (acumen 5-10 mm long), adaxially and abaxially glabrous.

Inflorescence cymose, dichasial, 12-24 flowered, 8-20 flowers open at the same time. Peduncle 30-40 mm long, glabrous. Inflorescence bracts 0.4 mm long, 0.7 mm wide, deltoid, glabrous. Rachis 3-7 mm long. Floral bracts 0.7 mm long, 0.4 mm wide at the base, ovate, glabrous. Pedicel 15-20 mm long, glabrous. Flower buds 5-5.5 mm long, 2-2.5 mm diam., ovoid; aestivation imbricate, dextrorse. Sepals 1.2-1.3 mm long, 0.6-0.7 mm wide, basally fused, abaxially glabrous; free sepal limbs ovate, apically acuminate. Corolla rotate; petals basally fused, 5.5-6.5 mm long, 1-1.2 mm wide, abaxially and adaxially glabrous; free petal limbs straight, incurved to horizontal, ovate, apically acute. Gynostegial corona 2.5-2.8 mm high, exceeding and partly obscuring the gynostegium. C(is) consisting of Cs and Ci fused for 3/4 to 7/8 of total corona height; only Ci differentiated. Cs appressed to the back of the stamens, erect, with strongly fimbriate, straight margins, adaxially with appendage and basal protuberance. Adaxial appendage shorter to equalling Cs, erect, laminar, rectangular, margin strongly fringed; space between Cs and appendage with fringes. Ci laminar; lobes of Ci keeled along the upper half of corona height; lobes of Ci unguiculate, triangular when flattened, with laterally involute margins. Gynostegium sessile, 0.8-0.9 mm high, 1.4-1.5 mm diam. Stamens without filament. Anthers broader than high, trapezoid, abaxially planar to biconvex. Anther wings convergent, 400-450 μ m long, extending along the whole length of the anther; space

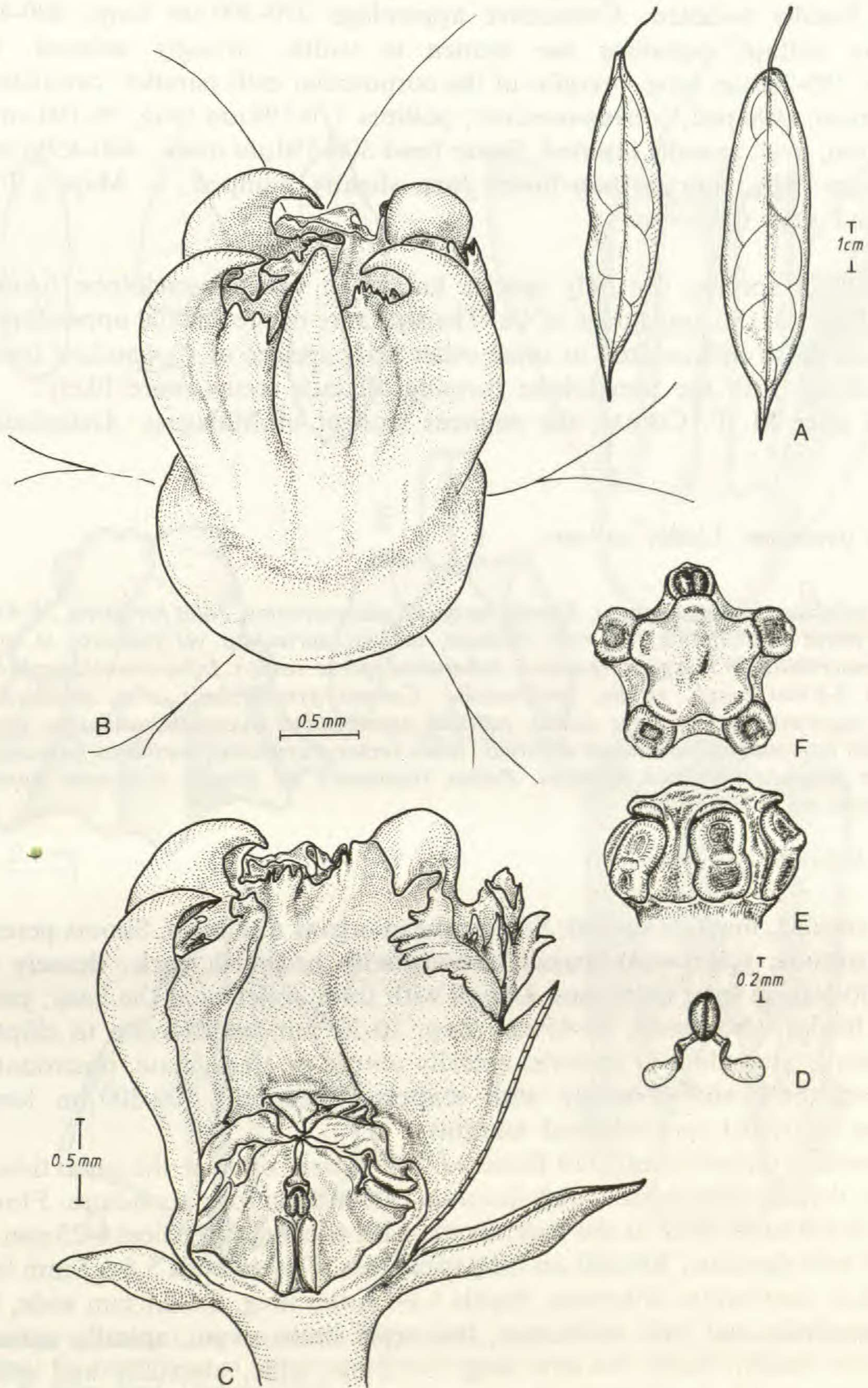


Fig. 3. — *Cynanchum chouxii* Liede & Meve : A, leaves ; B, flower ; C, gynostegium in relation to the corona (corolla removed, corona partially removed) ; D, pollinarium ; E, stylar head, lateral view ; F, stylar head ; top view (same scale for D-F). (Descoings 1821). Drawings by U. MEVE.

between proximal and distal ridge glabrous. Adjacent anther wings parallel to each other, centrifugal, basally widened. Connective appendage 270-300 μm long, 400-450 μm wide, triangular to deltate, equalling the stamen in width, strongly inflexed. Pollinarium : corpusculum 180-200 μm long, margins of the corpuscular cleft parallel; caudicles 120-130 μm long, cylindrical, s-shaped, convex-concave; pollinia 170-190 μm long, 90-100 μm wide, ovate in cross-section, oval, apically inserted. Styler head 500-550 μm diam., 400-450 μm high; upper part 50-100 μm high, shorter than lower part, slightly humped. — Map 1, Fig. 3.

Fruit and seed unknown.

Very distinct species, the only species known in which pseudolobe formation occurs together with an adaxial appendage of Cs. The structure of the adaxial appendage, however, is different from those encountered in some other leafy species of *Cynanchum* (see *C. moratii*). Thus, an affinity with the pseudolobe forming alliance seems more likely.

Named after M. P. CHOUX, the eminent student of Malagasy *Asclepiadaceae*.

Cynanchum itremense Liede, *sp. nov.*

Plantae volubiles, in basi lignosae. Surculi herbacei, glabrescentes. Folia herbacea, 25-45 mm longa, 10-20 mm lata, ovata vel elliptica, vel raro obovata, in basi auriculata vel cuneata, in apice obtusa vel emarginata, mucronata, in margine crenulata, indumento sparso vestita. Inflorescentia umbelliforma, 7-, 10-flora. Petala 5-6 mm longa, viridia, horizontalia. Corona gynostegialis alba, tubulata, 3.5 mm alta, gynostegium superans, hoc ex parte celans, partibus staminalibus interstaminalibusque perfecte connatis. Forma partium interstaminalium solum differens, lobos rectos, cucullatos, carinatos formans, margine recta vel lateraliter involuta fimbriata praedita. Partes staminales ad dorsum staminum appressae, erectae, margine integra, recta praeditae.

TYPE : *Bosser 18799* (holo-, P!).

Plants twining, much branched. Subterranean organs unknown. Shoots perennial, 1-2 mm diam., herbaceous, glabrescent, basally woody with brownish bark; densely covered with flexuous, 400-500 μm long trichomes. Leaves with three colleters at the base; petiole 5-10 mm long. Leaf blades herbaceous, 25-45 mm long, 10-20 mm wide, ovate to elliptic, or, rarely obovate, basally auriculate to cuneate, apically obtuse or emarginate, mucronate, marginally crenulate, adaxially and abaxially with scattered, flexuous, 400-500 μm long trichomes, indumentum restricted to veins and margins.

Inflorescence umbelliform, 7-10 flowered, 6-8 flowers open at the same time. Peduncle 5-20 mm long, densely indumented with flexuous, 300-400 μm long trichomes. Floral bracts 1.8-2 mm long, 0.4-0.6 mm wide at the base, ovate, with trichomes. Pedicel 8-25 mm long, densely indumented with flexuous, 300-400 μm long trichomes. Flower buds 5.5-6.5 mm long, 3-3.5 mm diam., conical; aestivation imbricate. Sepals 1.4-1.6 mm long, 0.6-0.8 mm wide, basally fused, abaxially glandular and with trichomes; free sepal limbs ovate, apically apiculate. Corolla rotate; petals basally fused, 5-6 mm long, 1-1.2 mm wide, abaxially and adaxially green, glabrous; free petal limbs straight, horizontal, oblong, apically obtuse. Gynostegial corona white, tubular, 3.5 mm high, exceeding and partly obscuring the gynostegium. C(is) consisting of completely fused Cs and Ci, only Ci differentiated. Cs appressed to the back of the stamens,

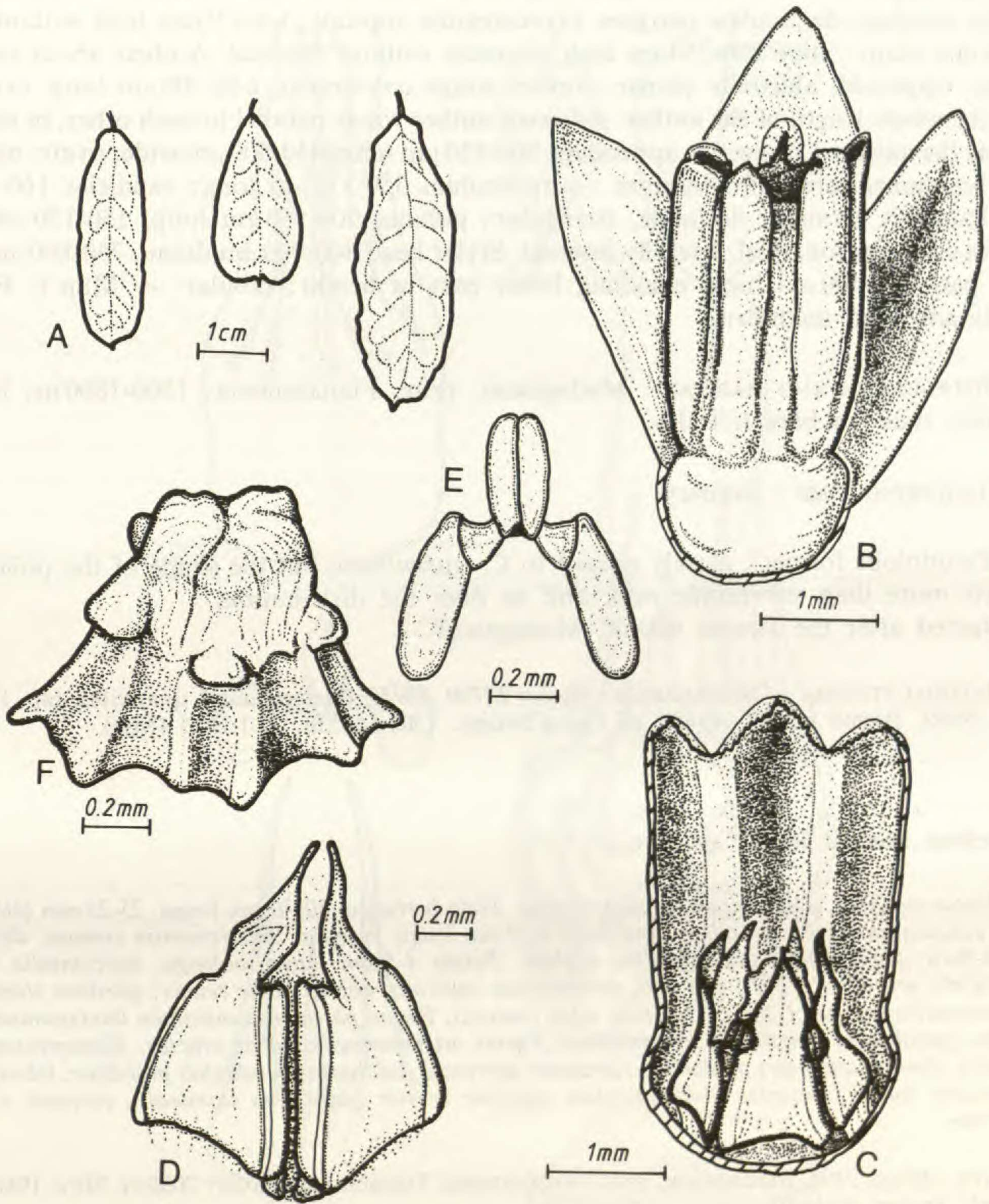


Fig. 4. — *Cynanchum itremense* Liede : A, leaves (left, middle, *Bosser 18799*; right, *Bosser 18932*); B, flower, two petals removed; C, gynostegium in relation to the corona (partially removed); D, anthers and guide rail; E, pollinarium; F, stylar head. (*Bosser 18932*).

apically erect, with entire, straight margins. Ci laminar, producing a pronounced convex fold along the upper two thirds of corona height; lobes of Ci cucullate, erect, with straight to laterally involute, denticulate margins. Gynostegium stipitate, 1.8-1.9 mm high without stipe, 1.7-1.8 mm diam.; stipe 200-250 μm high. Stamens without filament. Anthers about as broad as high, trapezoid, abaxially planar. Anther wings convergent, 650-700 μm long, extending along the whole length of the anther. Adjacent anther wings parallel to each other, in the same plane as the anther. Connective appendage 800-850 μm long, 450-500 μm wide, ovate, narrower than the stamen, erect. Pollinarium : corpusculum 350-370 μm long; caudicles 160-170 μm long, flattened, straight, declinate, triangular; pollinia 500-550 μm long, 150-170 μm wide, ovate in cross-section, oval, laterally inserted. Styler head 800-900 μm diam., 750-800 μm high; upper part 380-400 μm high, equalling lower part in height; tabular. — Map 1, Fig. 4.

Fruit and seed unknown.

DISTRIBUTION AND HABITAT : Madagascar, prov. Fianarantsoa; 1500-1800 m; between quartzitic rock on bare hillsides.

FLOWERING TIME : January.

'Pseudolobe former', closely related to *C. leucanthum*, but the shape of the pollinarium suggests more than subspecific rank and so does the distribution.

Named after the Itremo massif, Madagascar.

MATERIAL STUDIED. — MADAGASCAR : *Bosser 18799, 18932*, Itremo massif, quartzites, Jan. 1964 (P); *Croat 29869*, Itremo massif vicinity of Col d'Itremo, 1500-1685 m, 27.1.1975 (MO).

***Cynanchum moratii* Liede, sp. nov.**

Plantae volubiles, indumentum densum vestitae. Folia herbacea, 50-70 mm longa, 25-35 mm lata, ovata, in basi cuneata, in apicem apiculata, apicibus 14-20 mm longis praedita. Inflorescentia cymosa, dichasialis, 20-, 24-flora, flores 10-12 simul apertos evoluta. Petala 4-5 mm longa, oblonga, horizontalia. Corona gynostegialis urceolata, 3.0-3.5 mm alta, gynostegium superans, hoc ex parte celans; partibus staminalibus interstaminalibusque per 1/2-3/4 altitudinis totae connatis. Forma partium staminalium interstaminaliumque differens, partibus in longitudine consimilibus. Partes interstaminales lobos erectos, filamentosos, tortos formantes. Partes staminales ad dorsum staminum appressae, additamento adaxiali praeditae, lobos erectos, filamentosos, tortos formantes. Additamentum adaxiale brevior quam pars staminalis, erectum, elongato-liguliforme.

TYPE : *Morat 2291*, Madagascar, prov. Antsiranana, Tsaratanana massif; 2000 m, Nov. 1966 (holo-, P!). Only known material.

Plants twining, much branched. Subterranean organs unknown. Shoots perennial, 2.5-4.5 mm diam., herbaceous, glabrescent; indumentum dense with flexuous, 450-500 μm long trichomes. Leaves with 10-11 colleters at the base; petiole 15-30 mm long. Leaf blades herbaceous, 50-70 mm long, 25-35 mm wide, ovate, basally cuneate, apically apiculate (apex 14-20 mm long), adaxially with flexuous, 200-300 μm long trichomes, equally distributed over

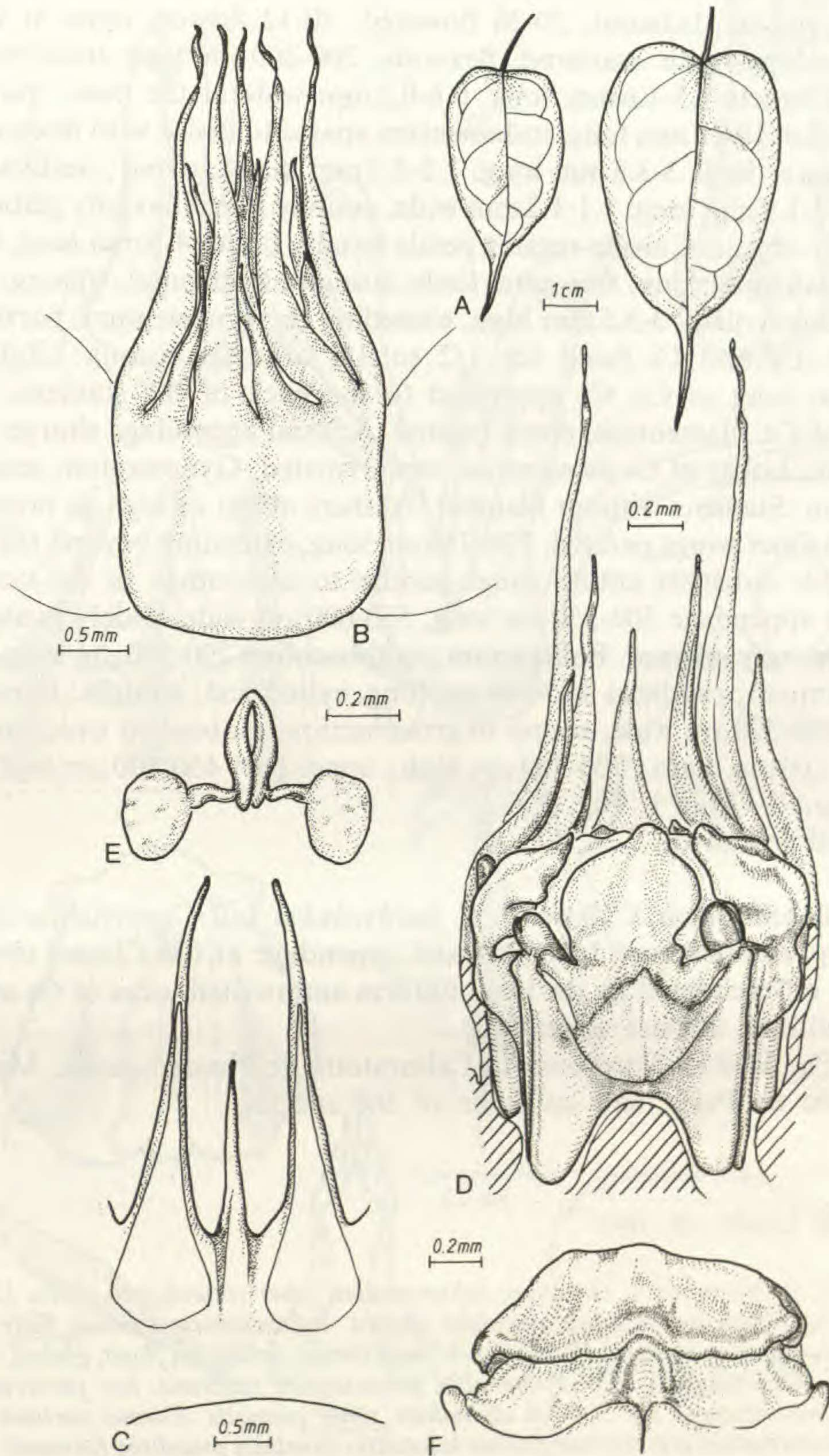


Fig. 5. — *Cynanchum moratii* Liedt : A, leaves ; B, flower, two petals removed ; C, corona adaxially, showing Cs with ligule, and Ci ; D, gynostegium in relation to the corona (partially removed) ; E, pollinarium ; F, stylar head. (Morat 2291). Drawings by U. MEVE.

the whole surface, indumentum scattered to sparse; abaxially with flexuous, 200-300 μm long trichomes, restricted to veins and margins, indumentum sparse.

Inflorescence cymose, dichasial, 20-24 flowered, 10-12 flowers open at the same time. Peduncle 40-50 mm long, with scattered, flexuous, 200-300 μm long trichomes. Rachis 25-35 mm long. Floral bracts 1.5-1.6 mm long, 0.6-0.7 mm wide at the base, triangular, basally with trichomes. Pedicel 10-15 mm long, indumentum sparse to dense with flexuous, 200-300 μm long trichomes. Flower buds 3-3.5 mm long, 2.2-2.5 mm diam., ovoid; aestivation imbricate, dextrorse. Sepals 1.3-1.4 mm long, 1.1-1.2 mm wide, entirely free, abaxially glabrous; free sepal limbs ovate, apically obtuse. Corolla rotate; petals basally fused, 4-5 mm long, 0.8-1 mm wide, abaxially and adaxially glabrous; free petal limbs straight, horizontal, oblong, apically acute. Gynostegial corona urceolate, 3-3.5 mm high, exceeding the gynostegium, partly obscuring it; C(is) consisting of Cs and Ci fused for $1/2$ to $3/4$ of total corona height; Cs and Ci differentiated, Ci as long as Cs. Cs appressed to the back of the stamens, adaxially with appendage; lobes of Cs, filamentose, erect, twisted. Adaxial appendage shorter than Cs, erect, elongated liguliform. Lobes of Ci filamentose, erect, twisted. Gynostegium sessile, 1.3-1.4 mm high, 1-1.1 mm diam. Stamens without filament. Anthers about as high as broad, rectangular, abaxially convex. Anther wings parallel, 730-750 μm long, extending beyond the anther proper, forming a basal arch. Adjacent anther wings parallel to each other, in the same plane as the anther. Connective appendage 500-550 μm long, 550-600 μm wide, widely ovate, equalling the stamen in width, strongly inflexed. Pollinarium: corpusculum 290-300 μm long, margins of the corpuscular cleft sinuate; caudicles 145-160 μm long, cylindrical, straight, horizontal; pollinia 250-260 μm long, 200-220 μm wide, round in cross-section, globose to oval, laterally inserted. Styler head 1000-1100 μm diam., 700-750 μm high; upper part 450-500 μm high, exceeding the lower part, tabular. — Map 1, Fig. 5.

Fruit and seed unknown.

With *C. analamazaotrense*, *C. baronii*, *C. pachycladon* and *C. pycnoneuroides* member of the 'ligulate' group, characterized by an adaxial appendage of Cs. Closest to the former two species, but clearly differentiated by the long, filiform and twisted lobes of Cs and Ci as well as the elongated liguliform adaxial appendage.

Named after Ph. MORAT, Directeur du Laboratoire de Phanérogamie, Muséum National d'Histoire Naturelle de Paris, and collector of the species.

Cynanchum subtilis Liede, *sp. nov.*

Plantae volubiles, 30-50 cm altae. Organum subterraneum tuber rotundatum. Folia 12-16 mm longa, 6-8 mm lata, ovata, in basi truncata, in apice apiculata, glabra. Inflorescentia cymosa, botrychoidea, 25-, 35-flora, flores 13-16 simul apertos evoluta. Petala 3.5-4.5 mm longa, viridia vel flava, glabra, linearia, patentia. Corona gynostegialis alba, tubulata, 3.5-3.6 mm alta, gynostegium superans, hoc pertecte celans; partibus staminalibus interstaminalibusque per $3/4$ - $7/8$ altitudinis totae connatis. Forma partium interstaminalium solum differens, lobos carinatos, erectos marginibus lateraliter involutis praeditos formans. Partes staminales erectae, ad dorsum staminum non appressae.

TYPE : Liede & Conrad 2827 (holo-, P!; iso-, MO, TAN!).

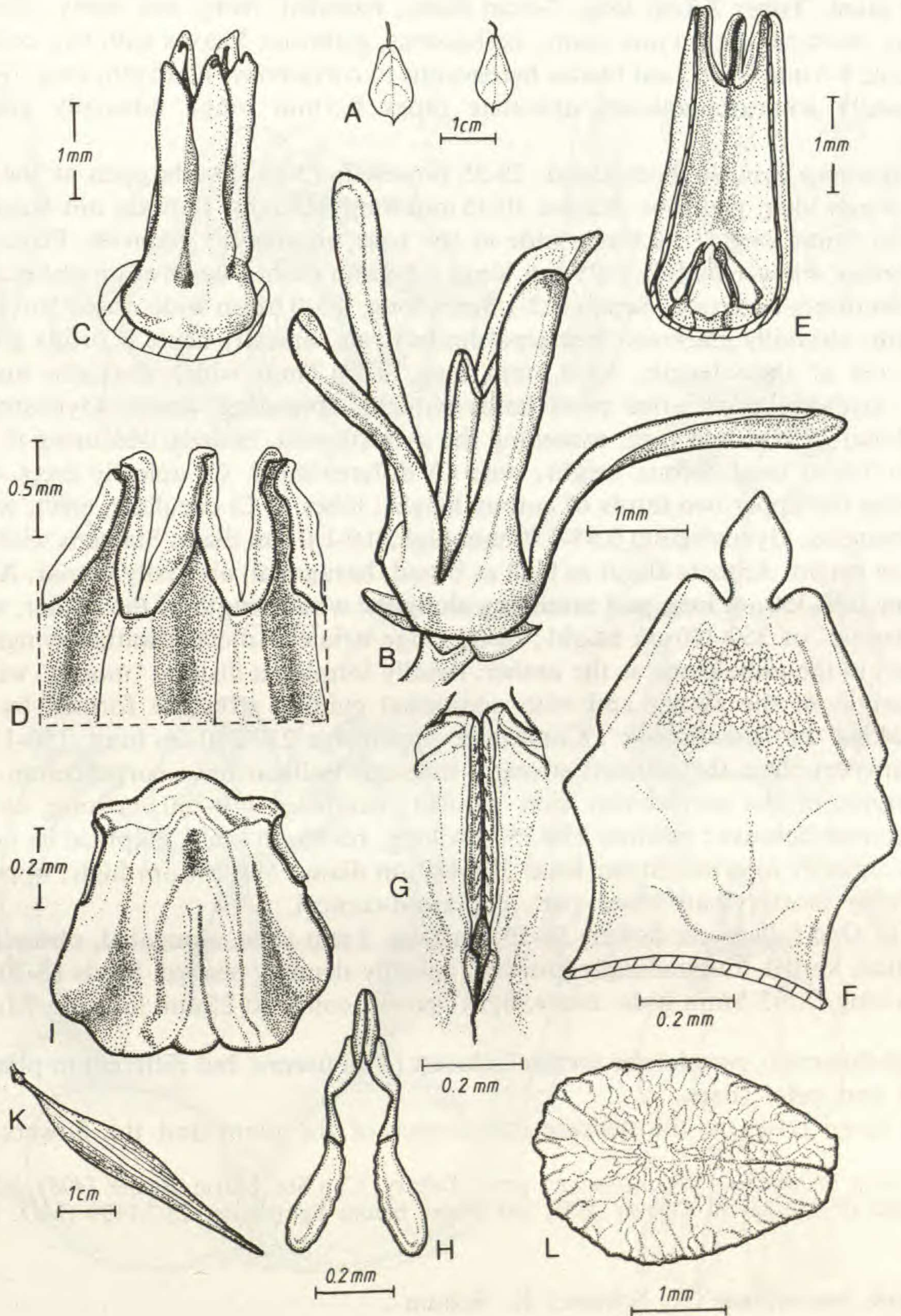


Fig. 6. — *Cynanchum subtilis* Liede : A, leaves; B, flower; C, corona (lateral view); D, corona (adaxial view, upper third), note the well developed Ci with laterally involute margins and the undifferentiated Cs; E, gynostegium in relation to the corona (partially removed); F, anther, abaxial view; G, guide rail; H, pollinarium; I, styler head (see also Fig. 9B); K, fruit; L, seed, coma removed. (Liede & Conrad 2827).

Plants twining, sparsely branched, 30-50 cm high. Subterranean organs tuberous, one tuber per plant. Tuber 2-3 cm long, 2-3 cm diam., rounded, ivory, not warty. Shoots annual (probably), 50-70 cm long, 1 mm diam., herbaceous, glabrous. Leaves with two colleters at the base; petiole 3-5 mm long. Leaf blades herbaceous to coriaceous, 12-16 mm long, 6-8 mm wide, ovate, basally truncate, apically apiculate (apex 0.5 mm long), adaxially and abaxially glabrous.

Inflorescence cymose, botrychoid, 25-35 flowered, 13-16 flowers open at the same time. Peduncle 4 mm long, glabrous. Rachis 10-15 mm long, straight. Flowers not fragrant. Floral bracts 1.2-1.3 mm long, 0.5-0.6 mm wide at the base, triangular, glabrous. Pedicel 3.5-4 mm long, glabrous. Flower buds 5.5-6.5 mm long, 1.5-2 mm diam.; aestivation imbricate, apically slightly contorted, dextrorse. Sepals 1.2-1.3 mm long, 0.5-0.6 mm wide, fused for 1/4 to 1/2 of their length, abaxially glabrous; free sepal limbs ovate, apically acute. Corolla rotate; petals fused to 1/4 of their length, 3.5-4.5 mm long, 0.5-0.7 mm wide, abaxially and adaxially glabrous, greenish-yellow; free petal limbs straight, spreading, linear. Gynostegial corona white, tubular, 3.5-3.6 mm high, exceeding the gynostegium, entirely obscuring it. C(is) fused for 3/4 to 7/8 of total corona height; only Ci differentiated. Cs apically erect. Ci laminar, keeled along the upper two thirds of corona height; lobes of Ci cucullate, erect, with laterally involute margins. Gynostegium 0.95-1.05 mm high, 0.9-1.0 mm diam. Stamens with filament of 150-200 μm height. Anthers about as high as broad, hexagonal, abaxially planar. Anther wings convergent, 330-350 μm long, not extending along the whole length of the anther, which forms a 'pseudostipe' of 350-380 μm height; distal ridge striate. Adjacent anther wings parallel to each other, in the same plane as the anther, basally forming a distinct 'mouth' with the basal lateral margin of the anther and with additional guiding structure formed by the anther margins along the 'pseudostipe'. Connective appendage 230-250 μm long, 150-175 μm wide, ovate, narrower than the stamen, strongly inflexed. Pollinarium: corpusculum 200-250 μm long, margins of the corpuscular cleft parallel; caudicles 170-200 μm long, cylindrical, s-shaped, convex-concave; pollinia 230-250 μm long, 65-80 μm wide, elliptical in cross-section, pyriform, apically inserted. Styler head 375-400 μm diam., 500-550 μm high; upper part 100-150 μm high, shorter than lower part, depressed-conical.

Fruit: One follicle per flower, 50-55 mm long, 2 mm wide, elongated, obtusely deltate in cross section, keeled, longitudinally grooved, apically strongly beaked. Seeds 15-20 per follicle, 4.5-5 mm long, 2.5-3.5 mm wide, ovate, light brown; coma 20-25 mm long. — Map 1, Fig. 6.

Small-flowered 'pseudolobe former', closest to *C. lineare*, but different in plant and tuber size, leaf and petal shape.

The name refers to the delicate appearance of the plant and the flowers.

MATERIAL STUDIED. — MADAGASCAR: prov. Toliary; Cap Ste. Marie. *Bosser 14081*, bush xérophile, March 1960 (P); *Liede & Conrad 2827*, old dunes before lighthouse, 23.2.1990 (MO, P, TAN).

Cynanchum leucanthum (K. Schum.) K. Schum.

In ENGLER & PRANTL, Nat. Pfl. fam. 4, 2 : 253 (1895).

Vincetoxicum leucanthum K. SCHUM., Bot. Jahrb. Syst. 17 : 138 (1893).

TYPE: *Hildebrandt 3197* (lecto-, P! designated here; holo-, B, *delet.*).

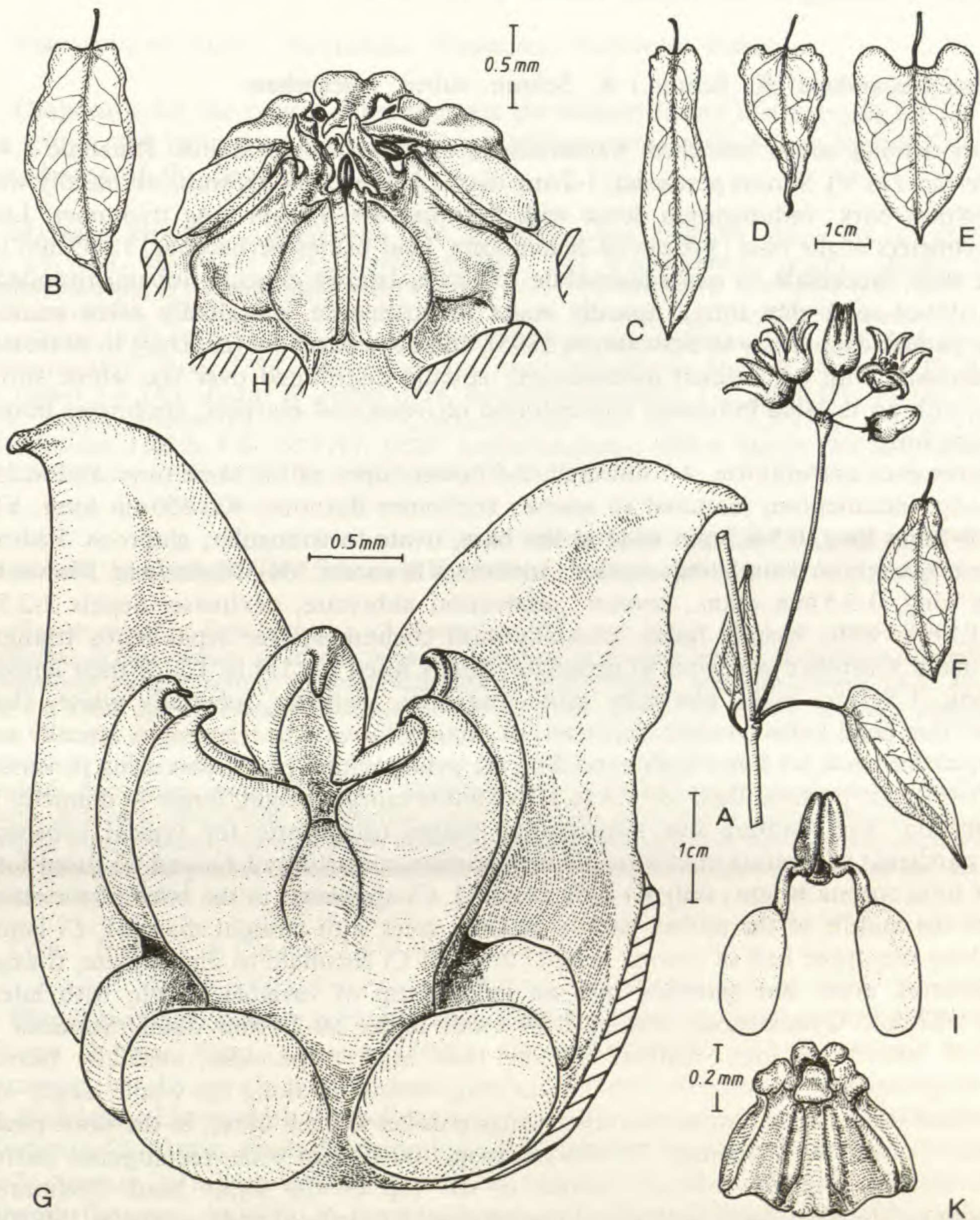


Fig. 7. — *Cynanchum leucanthum* (K. Schum.) K. Schum. subsp. *leucanthum* : A, plant; B-F, leaves (same scale); G, flower, three petals removed; H, gynostegium; I, pollinarium; K, stylar head (same scale for I and K). (A, Hildebrandt 3917; B, C, Perrier 16878; D, Perrier 11678; E, Peltier & Peltier 2434; F, Decary 17237; G, Perrier 16877; H, I, K, Decary 7470). Drawings by U. MEVE.

C. leucanthum is a fairly frequent and widespread species, variable enough to suggest an infraspecific concept. The papillose adaxial leaf surface characteristic for both subspecies recognized is missing in the closely related *C. itremense*.

Cynanchum leucanthum* (K. Schum.) K. Schum. subsp. *leucanthum

Plants twining, much branched. Subterranean organs rhizomataceous. Rhizome 2-4 mm diam. (*Perrier 11678*). Shoots perennial, 1-2 mm diam., herbaceous, glabrescent, basally woody with brownish bark; indumentum dense with flexuous, 400-450 μm long trichomes. Leaves with 4-5 colleters at the base; petiole 10-30 mm long. Leaf blades herbaceous, 13-45 mm long, 8-35 mm wide, lanceolate to ovate-lanceolate to ovate, basally cuneate, lobate, rounded, or truncate (lobes to 4 mm long), apically acute to acuminate, marginally often crenulate, adaxially papillose (contrary to SCHUMANN, 1895), adaxially papillose (contrary to SCHUMANN, 1895), adaxially with an isolated indumentum, equally distributed over the whole surface; abaxially with an isolated indument concentrated on veins and margins; trichomes flexuous, 400-450 μm long.

Inflorescence umbelliform, 4-7 flowered, 2-5 flowers open at the same time. Peduncle 15-35 mm long, indumentum scattered to sparse; trichomes flexuous, 400-450 μm long. Floral bracts 1.5-2 mm long, 0.5-0.7 mm wide at the base, ovate to triangular, glabrous. Pedicel 5-7 mm long, sparsely to densely indumented; trichomes flexuous, 300-350 μm long. Flower buds 3.5-4 mm long, 3-3.5 mm diam., conical; aestivation imbricate, dextrorse. Sepals 2-2.5 mm long, 1-1.5 mm wide, basally fused, abaxially with trichomes; free sepal limbs triangular, apically acute. Corolla cyathiform to urceolate; petals fused for 1/4 to 1/2 of their length, 4-5 mm long, 1.5-2 mm wide, abaxially white and rose, glabrous, adaxially white, slightly papillose; free petal limbs straight, incurved, or recurved, ovate to triangular, apically acute. Gynostegial corona 2.5-3.5 mm high, exceeding the gynostegium, partly obscuring it, vertically articulated. Lower portion fused for 1/3 to 1/2 of entire corona height, larger in diameter than upper portion, and forming five antisepalous bulges (diagnostic for typical subspecies), without particular separating structures. Upper portion consisting of Cs and Ci fused for 3/4 to 7/8 of total corona height; only Ci differentiated. Cs appressed to the back of the stamens (at about the middle of the anther backs), apically erect with straight margins. Ci laminar, keeled along the upper half of corona height; lobes of Ci cucullate to unguiculate, triangular when flattened, erect, but extended into an inflexed tip of variable length, with laterally involute margins. Gynostegium sessile, 1.3-1.4 mm high, 2.0-2.1 mm diam. Stamens with filament of 300-350 μm high. Anthers broader than high, trapezoidal, abaxially biconvex. Anther wings strongly convergent, 800-900 μm long, extending along the whole length of the anther; distal ridge striate. Adjacent anther wings parallel to each other, in the same plane as the anther. Connective appendage 380-400 μm long, 100-120 μm wide, rectangular, narrower than the stamen, strongly inflexed, adnate to the top of the stylar head. Pollinarium: corpusculum 220-250 μm long, margins of the corpuscular cleft parallel; caudicles 180-200 μm long, cylindrical, s-shaped, convex-concave; pollinia 380-400 μm long, 180-200 μm wide, ovate in cross-section, pyriform, apically inserted. Stylar head 500-600 μm diam., 500-600 μm high; upper part 220-300 μm high, shorter than lower part, tabular to capitate. — Map 1, Fig. 7.

Fruit and seed unknown.

DISTRIBUTION AND HABITAT : Madagascar, prov. Antananarivo; 1300-1500 m; forest.

FLOWERING TIME : November to March, May to June, August.

VERNACULAR NAME : Saritakala, Sarahotra, Vahivolo, Vahivy.

Diagnostic for the typical subspecies are the distinct fusion of the petals for 1/4 to 1/2 of their length, the pronounced antisealous swellings forming the lower part of C(is) and the inflexed tips of the free lobes of Ci.

MATERIAL STUDIED. — *d'Alleizette 1114*, Mandraka, Aug. 1906 (P); *Baron 154* (K); 824 (P); 1236 (K); *s.n.* (K); *Boivin s.n.* (P); *Campeon 1887*, bois d'Andrainarivony (P); *Decary 7439*, forêt d'Ambohitantely, N d'Ankazobé, 12.03.1930 (P); 7470, N d'Ankazobé 12.03.1930 (P); 17237, Manankazo, Tampoketsa d'Ankazobé, 03.01.1942 (P); *Dorr, Barnett & Cheek 3736*, station forestière de Manankazo, 19.02.1985 (MO, P); *Hildebrandt 3917*, Wald von Ankafina, Feb. 1881 (BM, P); *Jard. Bot. Tananarive 6814*, *Seyrig 578B*, Ampandrandava, April 1963 (P); *Le Myre de Vilers s.n.* (P); *Morat 4182* (P); *Parker s.n.* (K); *Peltier & Peltier 2434*, Antsakoamanondro, 17.05.1960 (P); *Perrier de la Bâthie 11678*, Angavo, 1400 m (P); 16877, 16878, Manerinerina, Dec. 1923 (P); 16937, au bord de l'Onive, près de Tsinjoarivo, 1300 m, Feb. 1925 (P); 18547, Ankeramadinika, 1400 m, March 1928 (P); *Rakotovao 9284 R.N.*, Sendrisoa, 29.06.1957 (P); 12104 *R.N.*, 26.06.1962 (P).

Cynanchum leucanthum (K. Schum.) K. Schum. subsp. **elongatum** Liede, *subsp. nov.*

Plantae volubiles. Folia herbacea, 25-70 mm (rare 8-15 mm) longa, 12-15 mm (rare 4-7 mm) lata, ovata vel elliptica, in basi cuneata vel lobata, in apice acuminata, in margine integra. Superficies adaxialis papillosa et indumento distante vestita. Inflorescentia cymosa, botrychoidea, vel umbelliforma, (6-), 10-, 13-flora, flores 6-8 simul apertos evoluta. Gemmae florales 6-6.5 mm longae, 1.2-1.5 mm diametro, elongato-conica. Petala 5-6 mm longa, abaxialiter veridia, adaxialiter rosea, linearia vel triangulata, patentia. Corona gynostegialis alba, tubulata, 3.5-4.5 mm alta, gynostegium superans, hoc ex parte celans, verticaliter articulata. Pars infera usque ad 1/3-1/2 altitudinis totae attingens, conica, in diametro dimidium superus aequans, structuris separationis peculiaribus carens; partibus staminalibus interstaminalibusque per 3/4-7/8 altitudinis totae connatis. Forma partium interstaminalium solum differens, lobos erectos, carinatos, carinam longam extensos, marginibus lateraliter involutis praeditos formans. Partes staminales ad dorsum staminum appressae, marginibus rectis praeditae.

TYPE : *Humbert & Capuron 25670* (holo-, P!).

Plants twining, sparsely to moderately branched. Subterranean organs rhizomataceous. Rhizome 2-4 mm diam. (*Bosser 17603*). Shoots perennial, 1-2 mm diam., herbaceous, glabrescent, basally woody with brownish bark; indumentum dense with flexuous, 400-600 μ m long trichomes. Leaves with 4-5 colleters at the base; petiole (6-)10-25 mm long. Leaf blades herbaceous, 25-70 mm, rarely 8-15 mm long, 12-15 mm (rarely 4-6 mm) wide, ovate to elliptic, basally cuneate, or lobate, apically acuminate, marginally entire, adaxially papillose and with scattered, flexuous, 400-450 μ m long trichomes, equally distributed over the whole surface, abaxially with scattered, flexuous, 600-650 μ m long trichomes, concentrated on veins and margins.

Inflorescence cymose, botrychoid to umbelliform, (6-)10-13 flowered, 6-8 flowers open at the same time. Peduncle (7-)10-15 mm long, sparsely indumented; trichomes flexuous, 400-

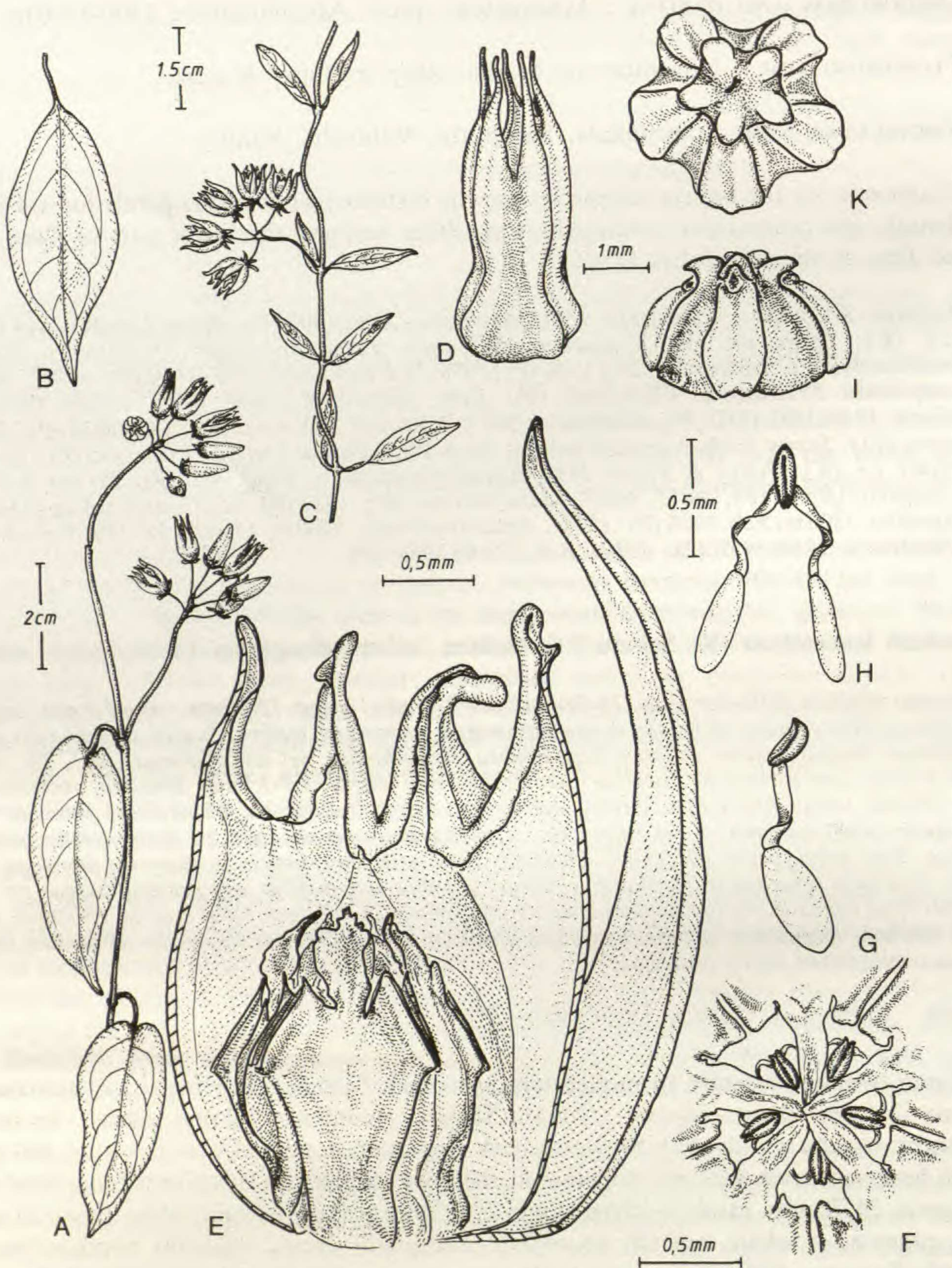


Fig. 8. — *Cynanchum leucanthum* (K. Schum.) K. Schum. subsp. *elongatum* Liede : A, plant ; B, leaf ; C, small-leaved form ; D, corona ; E, gynostegium in relation to the corona (partially removed) ; F, gynostegium in top view ; note the almost rectangular connective appendages adnate to the styler head ; G, corpusculum with one translator arm and pollinium in lateral view ; H, pollinarium in abaxial view ; I, styler head in lateral view ; K, styler head in top view (same scale for G-K). (A, B, D, F, *Humbert & Capuron 25670* ; C, E, G, H, I, K, *Humbert 23512*). Drawings by U. MEVE.

450 μm long. Rachis 5-8 mm long, straight. Floral bracts 1.5-2.5 mm long, 0.5-0.7 mm wide at the base, triangular to ovate, papillose. Pedicel 4-5 mm long, sparsely indumented; trichomes flexuous, 400-450 μm long. Flower buds 4.5-6.5 mm long, 1.5-2 mm diam., elongated-conical; aestivation basally imbricate to apically contorted. Sepals 2-2.2 mm long, 1-1.2 mm wide, basally fused, abaxially with trichomes; free sepal limbs ovate, apically acute. Corolla tubular; petals basally fused, 5-6 mm long, 0.8-1 mm wide, abaxially green, glabrous, adaxially rose, glabrous; free petal limbs straight, spreading, linear to triangular, apically obtuse. Gynostegial corona white, tubular, 3.5-4.5 mm high, exceeding the gynostegium, partly obscuring it, vertically articulated (not as conspicuously as in typical subsp.). Lower portion fused for 1/3 to 1/2 of C(is), conical, not different from upper portion in diameter, without particular separating structures; C(is) consisting of Cs and Ci fused for 3/4 to 7/8 of total corona height; only Ci differentiated. Cs appressed to the back of the stamens, with straight margins. Ci laminar, keeled along the upper two thirds of corona height; lobes of Ci cucullate (never unguiculate as in typical subsp.), and extended into a long tip; elongated-triangular when flattened, erect, with laterally involute margins. Gynostegium sessile, 1.2-1.5 mm high, 1.0-1.4 mm diam. *Stamens* with filament of 450-550 μm height. Anthers higher than broad, hexagonal, abaxially planar. Anther wings convergent, 400-700 μm long, not extending along the whole length of the anther, which forms a 'pseudostipe' of 400-500 μm height; outer guide ridge striate. Adjacent anther wings parallel to each other, in the same plane as the anther to centrifugal, forming a distinct 'mouth' with the basal lateral margin of the anther. Connective appendage 400-500 μm long, 200-300 μm wide, rectangular, narrower than the stamen, strongly inflexed, adnate to the top of the stylar head. Pollinarium: corpusculum 230-250 μm long, margins of the corpuscular cleft parallel; caudicles 600-700 μm long, flattened, s-shaped, convex-concave; ribbon-shaped; pollinia 450-500 μm long, 180-230 μm wide, elliptical in cross-section, pyriform, apically inserted. Stylar head 700-850 μm diam., 450-500 μm high; upper part 150-250 μm high, shorter than lower part, tabular to capitate. — Map 1, Fig. 8.

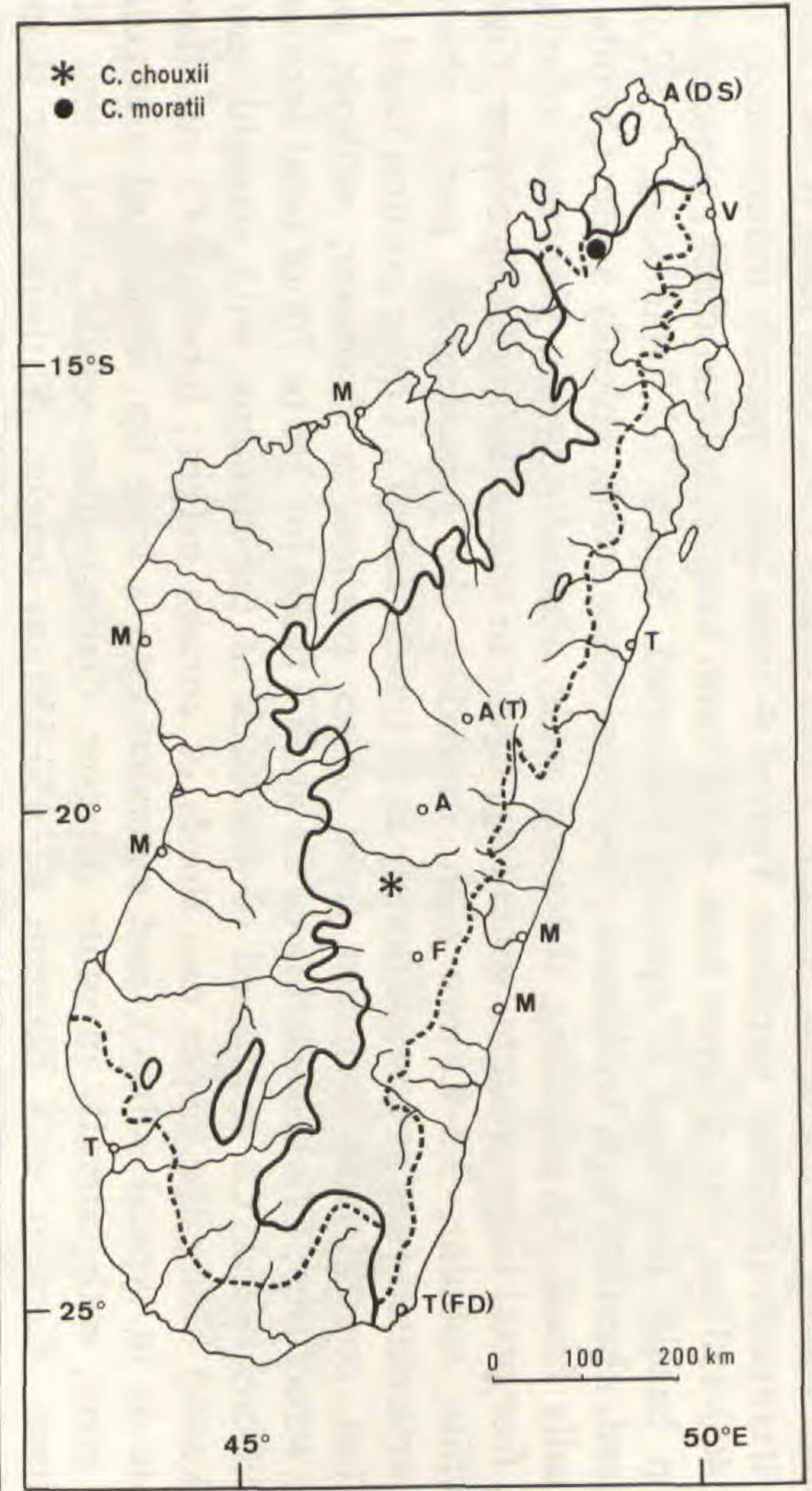
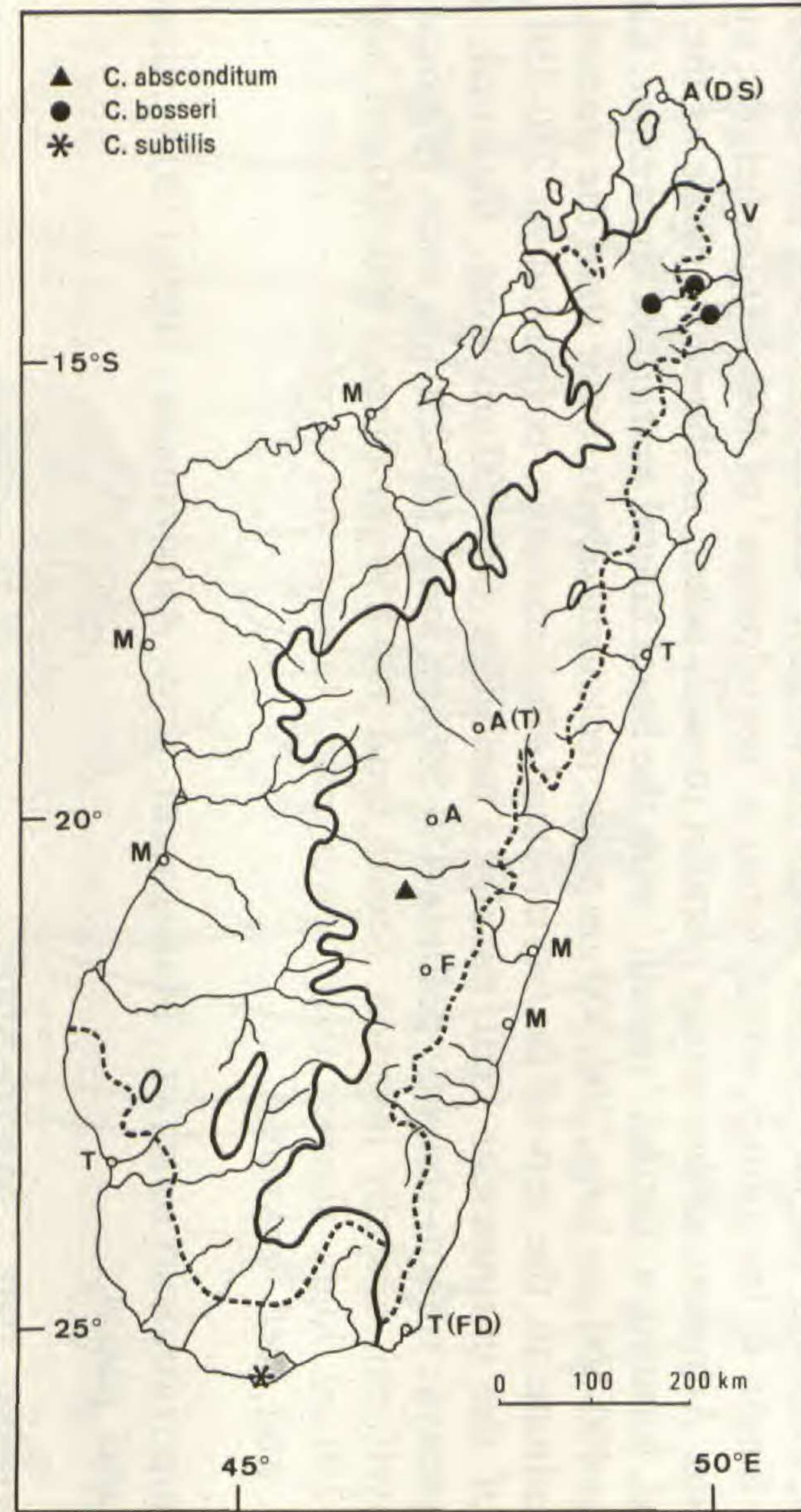
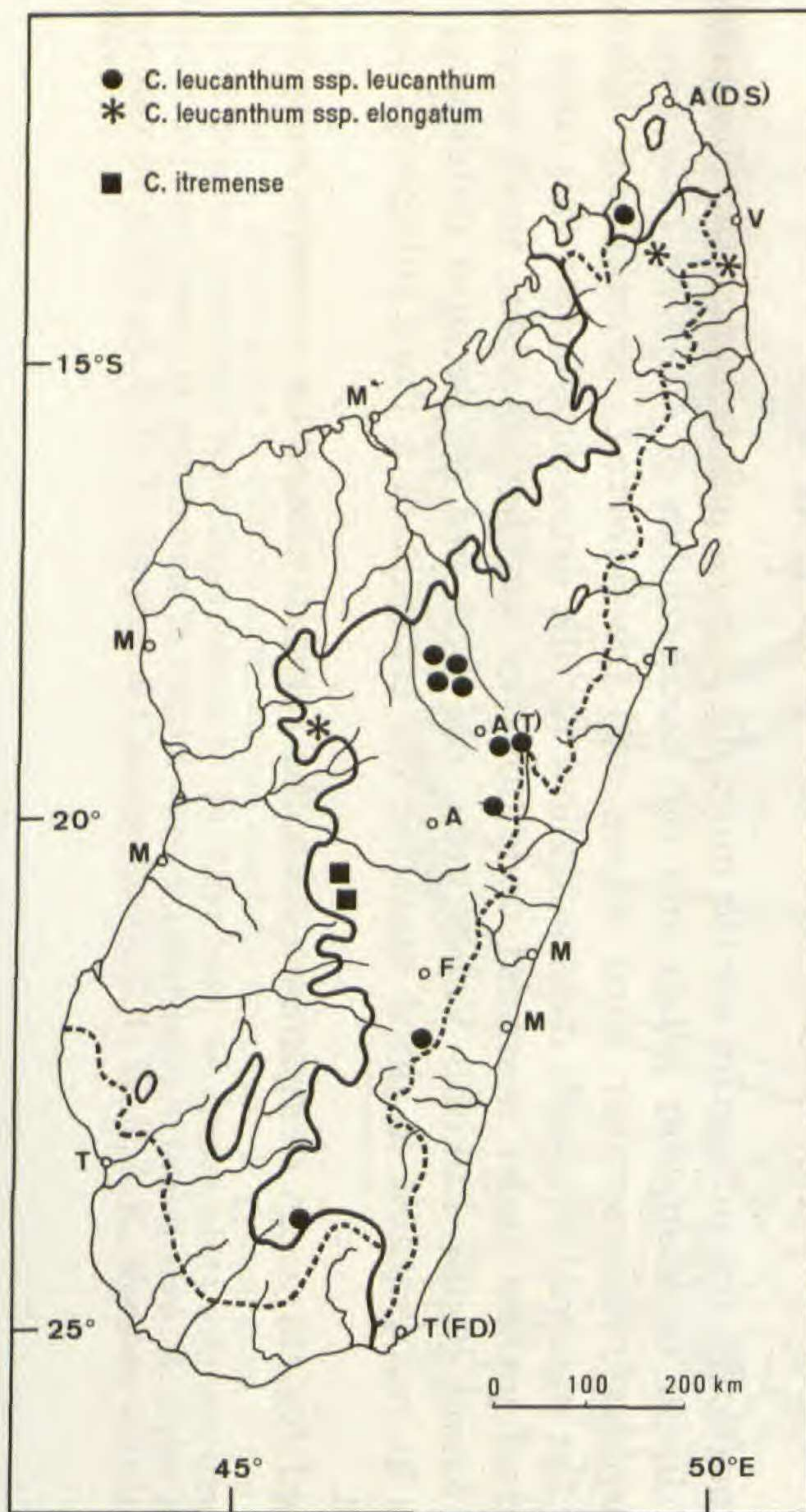
Fruit and seed unknown.

DISTRIBUTION AND HABITAT : Madagascar, prov. Antsiranana; 1000-1750 m; lichen forest on sand and gneiss.

FLOWERING TIME : March-April.

Diagnostic for the subspecies are the normally cymose inflorescence, the elongated-conical buds, the linear to triangular petals and the saccate lobes of Ci. One collection, *Humbert 23512*, displays much smaller sized leaves and few-flowered, umbelliform inflorescences. However, the material available does not allow for the decision whether this sheet represents an individual grown under marginal conditions or whether another, small-leaved form is generally found in the Lokoho Valley area. As there are no decisive differences in floral characters as recognizable in dried material, the creation of a third subspecies seems to be premature.

Named for its — in comparison with the typical subspecies — very long and slender corona.



Map 1.

MATERIAL STUDIED. — *Bosser 17603, 17603 bis*, Analandraisoa forest near Belobaka, April 1963 (P); *Humbert 23512*, Lokoho valley, Mt. Beondraka, N of Maroambihy, 17.-22.3.1949 (P); *Humbert & Capuron 25670*, Marivorahona massif, S.W. of Manambato, distr. Ambilobé, 18.-24.3.1951 (P).

REDUCTION OF THE GENUS *PYCNONEURUM* DECNE. TO *CYNANCHUM*

Cynanchum junciforme (Decne.) Liede, *comb. nov.*

Pycnoneurum junciforme DECNE., Ann. Sci. Nat., sér. 2, 9 : 340 (1838).

TYPE : *Bojer s.n.* (holo-, P!).

Cynanchum sessiliflorum (Decne.) Liede, *comb. nov.*

Pycnoneurum sessiliflorum DECNE., Ann. Sci. Nat., sér. 2, 9 : 341 (1838).

TYPE : *Goudot s.n. in herb. Delessert* (holo-, G, not seen).

DECAISNE has established the genus *Pycnoneurum* to accommodate two very uncommon species of Madagascar. Their erect habit, their long, linear (grass-like) leaves, their twisted petals and their flattened stylar head set these species very well apart from the species of *Cynanchum* known to him. The close affinity of *Pycnoneurum* and *Cynanchum* is noted by all subsequent authors (BAILLON, 1891; SCHUMANN, 1895). After the discovery of many other strange Malagasy *Cynanchum* species, CHOUX (1914) realized that none of the distinguishing characters of *Pycnoneurum* mentioned earlier is restricted to these two species; they all occur also in some other species of *Cynanchum*. He dismissed the separating character named by SCHUMANN (1895), namely, a mushroom-shaped stylar head. This view is to be followed; while stylar heads provide valuable characters for the understanding of Malagasy *Cynanchum* species, those of *Pycnoneurum*, though relatively flat, do not differ significantly from those found in *Cynanchum* (Fig. 9). Instead, CHOUX (1914) claims that the twisted petals form the true separating character for *Pycnoneurum*. This very conspicuous character is not yet understood in its consequences for pollination biology. Though the twisted petals force the flower to remain closed during their whole life-span, fruit set has been observed occasionally. Cleistogamy, however, seems unlikely, not only because it has only very rarely reported in the family (CHATURVEDI, 1988), but also because none of our freely flowering greenhouse plants has ever produced a fruit. For taxonomic purposes, however, this character is unsuitable for several reasons. First, twisted petals have been observed in several species of *Cynanchum* (e.g., *C. marnieranum* Rauh, *C. africanum* (L.) Hoffsgg.), and constitute most probably a plesiomorphic character in the group ('*Contortae*', the old name for the Gentianales, refers to this character). Second, some rare synapomorphies link these species to some *Cynanchum* species, especially *C. papillatum* Choux, namely, the prominent swelling at the base of the free

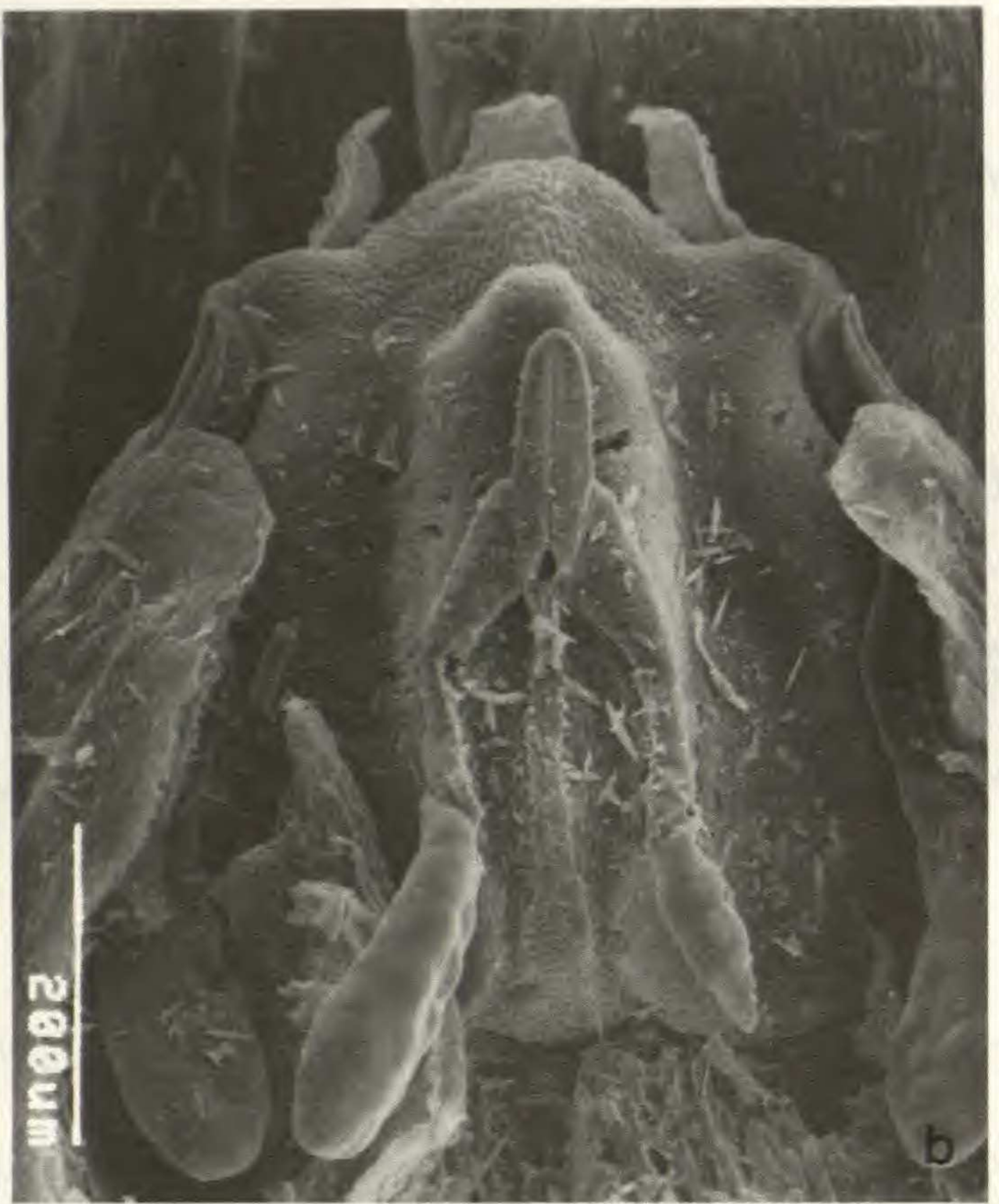


Fig. 9. — Stylar heads. **a**, *Cynanchum junciforme* (Decne.) Liede (*Liede & Conrad 2864*). — **b**, *Cynanchum subtilis* Liede (*Liede & Conrad 2827*). Note the pronounced lower part and the ridge supporting the corpusculum in both species.



Fig. 10. — **a**, *Cynanchum papillatum* Choux (*Liede & Conrad 2622*). — **b**, *Cynanchum junciforme* (Decne.) Liede (*Liede & Conrad 2864*). Note the pronounced swelling at the base of the free corolla limbs.

corolla lobes (Fig. 10), and the red, urceolate corona. The very similar tuber-morphology, the characteristic whitish-pink petal colour, and the many-flowered, umbelliform inflorescences support this close relationship. The transfer of the two species of *Pycnoneurum* to *Cynanchum* is thus inevitable. Within this large genus, *C. junciforme*, *C. sessiliflorum*, *C. papillatum* and *C. madagascariense* (K. Schum.) K. Schum., form a closely related alliance in the larger context of Malagasy 'pseudolobe formers'.

WHAT IS *CYNANCHUM SUBCORIACEUM* ?

One of the most frequent *Cynanchum* species in Madagascar is commonly filed under *C. subcoriaceum* Schltr. SCHLECHTER (1896) cited as type '*J. M. Hildebrandt 3866* — In regione centrali : In silva primaeva prope "Aukafina", Mart. 1881'. Such a specimen could neither be traced in B, where it was probably destroyed during the war, nor in P, where HILDEBRANDT'S collections of Malagasy plants are normally duplicated. However, a specimen was found under '*Saccostelma hildebrandtii* H. Baillon' — a *nomen nudum* — with exactly the same specifications, only the number is reading '3966' instead of '3866' (Fig. 11). It is thus most likely that a typing error has occurred (Ankafina, in the same citation, has been misspelled as 'Aukafina') and that this specimen represents the type of *C. subcoriaceum*. The plant on this sheet, however, represents *C. repandum* (Decne.) K. Schum. This coincides very well with SCHLECHTER'S (1896) remark that the corona of his new species is resembling the one of *C. natalitium* Schltr., a southern African species, which is true for *C. repandum*. Thus, *C. subcoriaceum* Schltr. is a synonym to *C. repandum* (Decne.) K. Schum.

Cynanchum repandum (Decne.) K. Schum.

In ENGLER & PRANTL, Nat. Pfl. fam. 4 (2) : 253 (1895).

C. subcoriaceum SCHLTR., Bull. Herb. Boissier 4 : 447 (1896).

TYPE : *Hildebrandt 3966* (Neo-, P!), designated here. Choice of neotype discussed in text.

However, the material identified by CHOUX (1923) and other students as *C. subcoriaceum* represents a different species. Analysis of the flowers has shown that they are identical with those of the type of *C. obovatum* (Decne.) Choux. Only two collections of this species with the characteristic obovate leaves were known previously, from widely separate localities. The variability of leaf shapes in the material of '*C. subcoriaceum*', noted by CHOUX (1928), seems to allow for the inclusion of forms with obovate leaves. Thus, the material known as '*C. subcoriaceum*' in most cases has to be identified as *C. obovatum*.

C. obovatum and *C. repandum* are closely related, but very easy to separate *in vivo*; in the former, the corona is closed completely over the gynostegium, completely visible in the latter. However, they can be difficult to separate when dried and have, in fact, often been confused.



Fig. 11. — Neotype of *Cynanchum subcoriaceum* Schltr. (Hildebrandt 3966).

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LITERATURE CITED

- BAILLON, H. E., 1891. — Asclépiadacées. *In* : *Hist. Pl.* 10 : 253.
- CHATURVEDI, S. K., 1988. — Abiotic Pollination in *Tylophora hirsuta* Wight (*Asclepiadaceae*). *Asklepios* 45 : 58-62.
- CHOUX, M. P., 1914. — Études biologiques sur les Asclépiadacées de Madagascar. *Ann. Mus. col. Marseille* 3.2 : 365-372.
- CHOUX, M. P., 1923. — Nouvelles études biologiques sur les Asclépiadacées de Madagascar. *Ann. Mus. col. Marseille* 4.1.2 : 25-28.
- CHOUX, M. P., 1928. — Les *Cynanchum* à feuilles de Madagascar. *Ann. Mus. col. Marseille* 4.5.2 : 5-74.
- FORSTER, P. I., 1991. — A taxonomic revision of *Cynanchum* L. (*Asclepiadaceae* : *Asclepiadoideae*) in Australia. *Austrobaileya* 3 (3) : 443-466.
- LIEDE, S. & KUNZE, H., in press. — A descriptive system for corona analysis in the *Asclepiadaceae*. *Pl. Syst. Evol.*
- SCHLECHTER, R., 1896. — Beiträge zur Kenntnis der afrikanischen Flora, neue Folge. *Bull. Herb. Boissier* 4 : 447.
- SCHUMANN, K., 1895. — *Asclepiadaceae*. *In* : ENGLER, A. & PRANTL, K., *Die natürlichen Pflanzenfamilien* 4 (2) : 189-305. Engelmann, Leipzig.

